determined?

A. The same utilization for Digital Loop Carrier lines at the RT was used for the switch digital line ports.

Q. How was the forward-looking utilization for analog line ports determined?

A. The utilization of analog lines is set at 93 percent.

Q. Does the SCIS model allow for administrative fill in its cost calculation?

A. Yes. SCIS has an input to allow for administrative spare for trunks and lines. In Verizon MA's study, the administrative spare capacity fills used are: digital trunk ports - 95 percent; digital line ports - 93 percent; and analog line ports - 95 percent.

Q. Does SCIS allow for breakage in its cost calculation?

A. Yes. SCIS adds one half of the cost of a line (or trunk) unit peripheral when it calculates the total cost of lines (and trunks).

Q. Did Verizon MA adjust the overall utilizations described above to account for SCIS treatment of administrative fill and breakage?

A. Yes. The utilizations for digital trunk ports, digital line ports, and analog line ports were adjusted for SCIS administrative fills and breakage for each office.

4. Switch Ports

Q. How were material investments converted to the port material investments?

A. Unit material investments for the Line and Trunk port components were obtained directly from the SCIS model office outputs, then adjusted as described above. Unit material investments were developed for analog line, digital line, Basic Rate ISDN ("ISDN BRI"), and coin line ports, and for digital and Primary Rate ISDN ("ISDN – PRI") trunk ports. The material investment associated with the Trunk Port was expressed on a per-port (Dedicated) basis and an all hours of the day ("AHD")[34] per-minute-of-use ("MOU") (Common) basis.

Q. Why was the Trunk Port cost calculated on both a per-port basis and an AHD-MOU basis?

A. The Trunk Port was calculated on a per-trunk basis for those carriers who wish to purchase dedicated trunk ports. The Trunk Port was calculated on an AHD-MOU basis for those carriers who simply purchase switching on a per-minute basis (*i.e.*, through the UNE

[34] "All Hours of the Day" means averaged over all time-of-day periods.

Platform).

Q. How were the material investments associated with trunk ports converted to a per-MOU basis?

A. The MOU trunk port cost was derived by dividing the trunk port investment by the designed busy-hour minutes of use capacity of the trunk port. The busy-hour investment was then converted to an AHD investment by the application of the annual-to-busy-hour ratio.

Q. How were the investments associated with coin ports developed?

A. Incremental investments associated with coin ports was determined from SCIS.

5. Usage

Q. How were material investments converted to Local Switch Usage material investment?

A. Total material investment for the Line and Trunk Port components from the SCIS model office outputs was subtracted from the total SCIS investment to arrive at a total switch usage investment. This investment (usage) represents all switch investment, without the Trunk Port and Line Port investments, and includes features.

Q. How was the material investment associated with usage converted to a MOU basis?

A. The usage investment was divided by the busy hour total switch MOU capacity (at the planning cycle midpoint) to arrive at a busy hour MOU investment for Usage.

Q. How was the total investment per busy hour MOU converted to a cost per AHD MOU?

A. The total investment per busy hour MOU was converted to a total cost per busy hour MOU by the application of annual cost factors and investment related loadings as previously described in this testimony. This total was converted to an AHD MOU cost by the application of the busy hour to AHD conversion factor.

Q. Are the Local Switching Usage originating and terminating MOU costs that Verizon MA is proposing applicable to both intra- and inter-switch calls?

A. Yes. The entire capacity of MOU (originating minutes *plus* terminating minutes) was use to develop the per-MOU costs of Local Switch Usage. The costs associated with a terminating MOU is the same cost for a terminating MOU for any call type (intra-switch or inter-switch). Likewise, the cost associated with an originating MOU is the same cost for originating MOU for any type of call (intra-switch or inter-switch).

Q. Is Verizon MA proposing to charge the originating usage rate for all originating minutes, and the terminating usage rate for all terminating minutes?

A. Yes. Verizon MA separated its total switching usage costs into terminating and originating costs.

Q. Please explain non-conversation time ("NCT") and how it relates to usage costs.

A. Conversation time is the actual time (in MOU) that switch resources are being used during the conversation part of each call. Non-conversation time represents the time that switch resources are being used other than during the actual conversation time. For example, NCT includes the time required for dialing the call, ringing, and call set-up. It also includes the time associated with calls that are not completed (that is, the called party does not answer). Since non-conversation times are not measured by the switches billing recordings, and thus cannot be billed, NCT must be added to the conversation minutes (MOU's) to account for these times.

Q. Please explain how RTU was included in Local Switching Usage?

A. The right-to-use factor was applied against the total in-place MOU busy hour investment to arrive at a right-to-use cost per busy hour

MOU. This cost was then added to the switch busy hour MOU usage cost to arrive at a total busy hour MOU cost for local switch usage.

a) Reciprocal Compensation Usage (Terminating)

Q. Please explain why the Company is filing a separate usage (terminating) cost for Reciprocal Compensation.

A. Section 251 (b)(5) of the Act states that all Local Exchange Carriers have "the duty to establish reciprocal compensation arrangements for the transport and termination of telecommunications." Reciprocal compensation arrangements include the mutual and reciprocal recovery of costs through cash payments or other non-cash transactions such as bill-and-keep arrangements. Additionally, incumbent local exchange carriers are obligated to provide interconnection "on rates, terms, and conditions that are just, reasonable, and nondiscriminatory."[35] In Section 252(d)(2)(A), the Act specifies that a state Commission can not consider the terms and conditions to be just and reasonable unless -,

i. Such terms and conditions provide for the mutual and reciprocal

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[35] Telecommunications Act of 1996 at SEC. 251 (c)(2)(D)

recovery by each carrier of costs associated with the transport and termination on each carrier's network, facilities of calls that originate on the network facilities of the other carrier; and

ii. Such terms and conditions determine such costs on the basis of a reasonable approximation of the *additional costs* of terminating such calls.

Therefore, the Company has appropriately filed costs associated with the *additional costs* of terminating such calls..

Q. Please explain how the Reciprocal Compensation usage cost was developed.

A. The additional costs associated with basic usage type calls (no-features) were determined in the same manner as previously described for Local Switch Usage, however the getting started[36] investments identified by SCIS, and RTUs were excluded.

6. Port Additives

Q. How were the investments associated with the "port additives"

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[36] "Getting started" investments represent the investments associated with switch processor and memory, and are not impacted by the additional reciprocal compensation usage.

developed?

A. The incremental hardware investments associated with optional features was determined by running each feature through SCIS/IN. SCIS/IN is the module of SCIS that calculates incremental investments associated with specific features of the switch. When Telcordia releases a new version of SCIS/MO, it also releases a new version of SCIS/IN to run in conjunction with it. Verizon MA used Version 2.8 of SCIS/IN in conjunction with SCIS/MO Version 2.8.

Q. How were the material investments described above converted to in-place investments?

A. The material investments were converted to total in-place investments by the use of loading factors for power, EF&I, and L&B as previously described.

7. Deaveraging

Q. Should Local Switching rates be deaveraged?

A. No. Differences in local switching rates between zones could lead to asymmetric inter-zone usage rates. Calls originating from point A and terminating at point B might wind up being rated differently than calls originating from point B and terminating at point A. This is an undesirable result and proposes statewide local usage rates to guard

against this possibility.

D. TANDEM SWITCHING

1. Element Description

Q. What is the tandem switching element?

A. Tandem switching is defined as follows in FCC Rule 319(c)(2). Local Tandem Switching Capability. The tandem switching capability network element is defined as:

(A) Trunk-connect facilities, which include, but are not limited to, the connection between trunk termination at a cross connect panel and switch trunk card;

(B) The basic switch trunk function of connecting trunks to trunks; and

(C) The functions that are centralized in tandem switches (as distinguished from separate end office switches), including but not limited, to call recording, the routing of calls to operator services, and signaling conversion features.

Q. Please define the tandem switching element used in Verizon MA's forward-looking incremental cost study.

A. The tandem switching element used in the Company's cost study

consists of trunk ports (digital) and usage. Trunk ports are either dedicated or common. Common trunk ports are recovered on a per minute-of-use basis.

2. Technology Assumptions

Q. Please describe the forward-looking tandem switch construct.

A. The forward-looking tandem switch construct is based on the latest available tandem digital switching with a mix of 5ESS (82.90 percent) and DMS-200 (17.10 percent) technologies based on the number of trunks, placed at current tandem locations.

Q. Please describe in detail how the construct was designed.

A. Existing office parameters, adjusted to make them forward-looking, were provided by Verizon MA's engineering organization for each existing tandem switch in Massachusetts, and were used to create SCIS model offices for both DMS-200 and 5ESS technology. SCIS then calculated, by switch technology type, unit and total switch material investments for both technologies.

Q. Please describe how the tandems were adjusted to make them forward-looking.

A. Tandem switches were adjusted In the same manner as previously described for Local Switching.

3. General Costing Approach

Q. Please describe the cost methodology used in developing the Tandem Switching element.

A. The cost methodology used in developing the Tandem switching costs is consistent with the cost methodology described above for local switching.

Q. Did the Company deaverage the Tandem Switching element by zone?

A. No. Since tandem switching will provide delivery of calls between two (or more) density zones, it would not be meaningful to develop deaveraged tandem switching costs.

Q. How were the material investments for the tandem developed?

A. The material investments for the tandem were developed using SCIS, in the same manner described for Local Switching. However the feature module of SCIS was not required because trunk features are provided solely by software and the processor.

Q. Please explain how RTU was included in Tandem Switching?

A. RTU was included in Tandem Switching in the same manner as previously described for Local Switching.

E. TOPS SWITCHES

Q. What is a "TOPS" switch?

A. A TOPS ("Telephone Operator Position System") switch is the switch type utilized for routing Operator Services calls in Verizon MA's network. A TOPS switch is a type of tandem switch.

Q. What cost elements has the Company identified for access to TOPS switches?

A. The Company has identified the investment and associated cost for a DS1 level trunk termination. The cost associated with the trunk termination has been developed on a per trunk basis for dedicated trunks, as well as a per MOU for common trunks.

Q. Please define the TOPS trunk port element used in Verizon MA's study.

A. The TOPS trunk port element used in the Company's cost study consists of digital DS1 trunk ports. Trunk ports can be either dedicated or common. Costs of common trunk ports are recovered on a per minute of use basis; costs of dedicated trunk ports are recovered on a monthly recurring basis.

Q. Please describe the forward-looking TOPS switch construct.

A. The forward-looking TOPS switch construct is based on the latest

available TOPS digital switching, which is DMS-200 technology , placed at current TOPS locations.

Q. Please describe in detail how the construct was designed.

A. The forward-looking DMS-200 TOPS switches were developed by reviewing all of Verizon MA's TOPS switches in Massachusetts, and adjusting them to make them forward-looking in the same manner previously described for Local Switching. The forward-looking offices were then used as the basis for determining the investments associated with the TOPS Switching element.

Q. Please describe the cost methodology used to develop the TOPS trunk port cost.

A. The cost methodology used to develop the TOPS port cost is consistent with the cost methodology described for the Local Switching trunk port cost above.

Q. Did the Company deaverage the TOPS trunk port element by zone?

A. No. Like tandems, TOPS will provide delivery of calls between two (or more) density zones. It is thus not meaningful to develop deaveraged TOPS trunk port costs.

Q. How were the material investments for the TOPS developed?

A. The material investments for the TOPS were developed using SCIS,

in the same manner described for Local Switching. However the feature module of SCIS was not required because trunk features are provided solely by software and the processor.

Q. Please explain how RTU was included in TOPS Switching?

A. RTU was included in TOPS Switching in the same manner as previously described for Local Switching.

IX. INTEROFFICE TRANSPORT

Q. Please describe the Interoffice Transport (or "IOF"[37]) element.

A. The element is defined as follows in FCC Rule 319(d).

> Interoffice Transmission Facilities. An incumbent LEC shall provide nondiscriminatory access, in accordance with § 51.311 and section 251(c)(3) of the Act, to interoffice transmission facilities on an unbundled basis to any requesting telecommunications carrier for the provision of a telecommunications service.
>
> (1) Interoffice transmission facility network elements include:
>
> (A) Dedicated transport, defined as incumbent LEC transmission facilities, including all technically feasible capacity-related services including, but not limited to, DS1, DS3 and OCn levels, dedicated to a particular customer or carrier, that provide telecommunications between wire

[37] "IOF" stands for Interoffice Facilities.

centers owned by incumbent LECs or requesting telecommunications carriers, or between switches owned by incumbent LECs or requesting telecommunications carriers;

(B) Dark fiber transport, defined as incumbent LEC optical transmission facilities without attached multiplexing, aggregation or other electronics;

(C) Shared transport, defined as transmission facilities shared by more than one carrier, including the incumbent LEC, between end office switches, between end office switches and tandem switches, and between tandem switches, in the incumbent LEC network.

A. DEDICATED TRANSPORT

1. Element Description

Q. Please define the Dedicated Interoffice Transport element used in Verizon MA's forward-looking incremental cost study.

A. The Dedicated IOF element is defined as IOF transmission facilities dedicated to a particular customer. Dedicated IOF is offered between Verizon MA owned wire centers at the following signaling levels: DS0, DS1, DS3, STS-1, OC-3, OC-12, and OC-48. Monthly costs have been developed on a "fixed" basis and a "per mile" basis for each signaling level facility.

Q. In general, what are the fixed (non-mileage-sensitive) costs of dedicated transport?

A. The fixed investments are those investments identified at the originating and terminating Verizon MA wire centers, which include electronic equipment such as SONET add/drop multiplexers, digital cross connect systems ("DCS"), and fiber terminations.

Q. In general, what are the per-mile costs of dedicated transport?

A. The variable investments are those investments which vary with the length of the facility and contain interoffice fiber cables, structure, and any electronics at intermediate Verizon MA serving wire centers.

2. Technology Assumptions

Q. Please describe the forward-looking IOF construct used as the basis for developing the costs associated with Dedicated IOF Transport.

A. Verizon MA is using SONET fiber optic transport rings for growth applications in the interoffice network. The IOF Transport cost studies have been based on facility models, which are schematics representing equipment routing and configurations using this construct. The facility models were created to serve signal levels (DS0, DS1, DS3, STS-1, OC-3, OC-12, and OC-48) throughout the Verizon MA IOF network.

The model also identifies three types of SONET ring arrangements, based on the complexity (high, medium, and low) of the IOF configuration being served.

3. Utilization

Q. How is utilization accounted for in the transport study?

A. Consistent with the definition used throughout these studies, utilization is accounted for as a percent of total installed capacity. Interoffice transport elements (DS0, DS1, DS3, etc) must pass through one or more levels of multiplexing to be carried by the backbone transport network. As is the case with all network capacity, the interoffice facility multiplexing equipment, including electronic digital cross connect machines, cannot be operated at 100 percent of capacity. A reasonable utilization level must be estimated for these elements. The factors of rapid interoffice facility growth, churn, equipment breakage, and administrative spare must all be reflected in the utilization level. The combined impact of these factors yields an estimated forward looking fill of 75 percent. This 75 percent utilization factor is applied in the study at each multiplexing level in the IOF model.

4. Costing Approach

Q. Describe how the investments for Dedicated IOF Transport were developed.

A. IOF investments were developed on a fixed and variable basis. The fixed investments, which were identified at the originating and terminating Verizon MA serving wire centers, include electronic equipment such as SONET Add/Drop Multiplexers, digital cross connect frames, and fiber termination frames. The variable investments, which were developed on a per-mile basis, are those that vary with the length of the facility and contain the interoffice fiber cable, structure, and any electronics necessary at intermediate Verizon MA serving wire centers.

Q. Were structure investments included in the IOF study?

A. Yes. Outside plant interoffice structure investments were determined using the same methodology as previously described to determine loop structure investments.

Q. On what basis were the material and installation prices determined for IOF?

A. Material prices for electronic equipment and cables reflect the latest negotiated contract prices Verizon MA has with the manufacturers of

the circuit equipment and interoffice cable facilities. Circuit equipment investment loading factors were multiplied by the material prices to arrive at a total investment. Fiber cable installation and engineering costs were obtained from ECRIS.

Q. Did the Company's cost study deaverage the Dedicated IOF Transport investments by density zones?

A. No. Neither the "fixed or "variable" cost components are density sensitive. Since an unbundled Dedicated IOF Transport facility can originate and terminate in different density zones (as well as pass through different central office nodes along the SONET rings), it is not appropriate to deaverage the dedicated transport costs.

B. COMMON TRANSPORT

Q. Please define the Common Interoffice Transport element used in Verizon MA's forward-looking incremental cost study.

A. The Common IOF element is defined as IOF transmission facilities shared by more than one customer or carrier. Common IOF is offered between Verizon MA owned wire centers on an MOU basis.

Q. Please describe how the MOU cost was developed for the Common IOF Transport element.

A. The MOU cost for Common IOF Transport was developed by dividing the Dedicated Transport investments by the capacity of annual minutes of usage that could be transported by those investments. This is a reasonable approach because Common Transport uses the same physical interoffice facilities as Dedicated Transport.

X. SIGNALING SYSTEMS AND CALL-RELATED DATABASES

Q. Please describe the signaling system and call-related databases element.

A. The element is described in FCC Rule 319(e) as follows:

> Signaling Networks and Call-Related Databases. An incumbent LEC shall provide nondiscriminatory access, in accordance with § 51.311 and section 251(c)(3) of the Act, to signaling networks, call-related databases, and service management systems on an unbundled basis to any requesting telecommunications carrier for the provision of a telecommunications service.
>
> (1) Signaling Networks: Signaling networks include, but are not limited to, signaling links and signaling transfer points.
>
> (A) When a requesting telecommunications carrier purchases unbundled switching capability from an incumbent LEC, the incumbent LEC shall provide access from that switch in the same manner in which it obtains such access itself.
>
> (B) An incumbent LEC shall provide a requesting telecommunications carrier with its own switching

facilities access to the incumbent LEC's signaling network for each of the requesting telecommunications carrier's switches. This connection shall be made in the same manner as an incumbent LEC connects one of its own switches to a signaling transfer point.

(2) Call-Related Databases: Call-related databases are defined as databases, other than operations support systems, that are used in signaling networks for billing and collection, or the transmission, routing, or other provision of a telecommunications service.

(A) For purposes of switch query and database response through a signaling network, an incumbent LEC shall provide access to its call-related databases, including but not limited to, the Calling Name Database, 911 Database, E911 Database, Line Information Database, Toll Free Calling Database, Advanced Intelligent Network Databases, and downstream number portability databases by means of physical access at the signaling transfer point linked to the unbundled databases.

(B) Notwithstanding the incumbent LEC's general duty to unbundle call-related databases, an incumbent LEC shall not be required to unbundle the services created in the AIN platform and architecture that qualify for proprietary treatment.

(C) An incumbent LEC shall allow a requesting telecommunications carrier that has purchased an incumbent LEC's local switching capability to use the incumbent LEC's service control point element in the same manner, and via the same signaling links, as the incumbent LEC itself.

(D) An incumbent LEC shall allow a requesting telecommunications carrier that has deployed its

own switch, and has linked that switch to an incumbent LEC's signaling system, to gain access to the incumbent LEC's service control point in a manner that allows the requesting carrier to provide any call-related database-supported services to customers served by the requesting telecommunications carrier's switch.

(E) An incumbent LEC shall provide a requesting telecommunications carrier with access to call-related databases in a manner that complies with section 222 of the Act.

(3) Service Management Systems:

(A) A service management system is defined as a computer database or system not part of the public switched network that, among other things:

(1) Interconnects to the service control point and sends to that service control point the information and call processing instructions needed for a network switch to process and complete a telephone call; and

(2) Provides telecommunications carriers with the capability of entering and storing data regarding the processing and completing of a telephone call.

(B) An incumbent LEC shall provide a requesting telecommunications carrier with the information necessary to enter correctly, or format for entry, the information relevant for input into the incumbent LEC's service management system.

(C) An incumbent LEC shall provide a requesting telecommunications carrier the same access to design, create, test, and deploy Advanced Intelligent Network-based services at the service

management system, through a service creation environment, that the incumbent LEC provides to itself.

(D) An incumbent LEC shall provide a requesting telecommunications carrier access to service management systems in a manner that complies with section 222 of the Act.

A. SCOPE

Q. What is the scope of the studies presented here by Verizon MA concerning this element?

A. As explained above, the studies of this element that are presented here are limited to the signaling network elements, including STP Port and Signaling links, access to certain databases, and Service Management System.

B. ELEMENT DESCRIPTION

Q. Please define the signaling network elements used in Verizon MA's forward-looking incremental cost study.

A. Modern telecommunications networks transmit signaling information over communication paths separate from those used to transmit the voice communication itself. Signaling information is switched at Signaling Transfer Points ("STPs"), and is carried between STPs and local and tandem switches over signaling links. Routing and other information used by the signaling network are stored in call-related

databases known as Intelligent Service Control Points ("ISCPs"). The protocol used for signaling information is known as Signaling System 7 ("SS7"). A call-related database query is a switch query and database response through the signaling network, which provides access to Verizon MA's Line Information Database ("LIDB") and Toll Free Calling ("800") database by means of physical access at the STP.

C. STP PORT AND SIGNALING LINK

Q. Please describe the forward-looking construct used to develop the costs associated with the STP port for A-link traffic.

A. A representative model STP was determined by reviewing the actual STP network, number of ports, and the number of SS7 links. A forward-looking representative switch, based on the latest available STP technology, was designed. The forward-looking model office was used as the basis for determining the investments associated with the STP port element.

Q. Please describe the cost methodology used in developing the STP port element and signaling link element.

A. The cost methodology used in developing the STP port cost is consistent with the cost methodology for switching described previously.

Q. Did the Company deaverage the STP port element?

A. No. Since the signaling network provides signaling for calls between two (or more) density zones, it would not be meaningful to develop deaveraged STP port costs.

Q. How were the material investments for the STP port developed?

A. The material investments for the STP were developed using Telcordia's Common Channel Signaling Cost Information System ("CCSCIS"), in the same manner as described for Local Switching for the SCIS. The latest negotiated vendor discount was applied to the material investment in CCSCIS.

Q. What version of CCSCIS was used for Verizon MA's study?

A. The latest available version from Telcordia, Version 5.0.4.

Q. Please describe how the investment for the signaling link investment was developed.

A. The investment of the Signaling Link element was developed by taking the investments and the associated costs previously developed for the Dedicated Transport "fixed" and "mileage" elements at the